

## 2.3.16. Air Combat Modes

### 2.3.16.1. Purpose

The purpose of this test is to evaluate the utility of the radar ACM modes as an aid to acquire and track close range maneuvering targets.

### 2.3.16.2. General

The nature of the ACM modes requires that they perform in situations where both the target and test airplanes are maneuvering at their absolute limit and in every conceivable range of g, crossing rate, extreme clutter etc., since it will be the goal of the target to use these limits to prevent an ACM acquisition. These absolute limits are beyond the scope of our test since they require extensive instrumentation to document problems, telemetry to ensure safety limits are not exceeded and more fuel and time than we can spare for our quick qualitative assessment. We will look at a few mission relatable situations and qualitatively assess the results, gathering data to support the assessment. The target will fly straight and level and then in a constant, moderate g turn, while the test airplane maintains visual contact and maneuvers behind the target using rolling push-overs and pull-ups to generate moderate crossing rates, g rates and varying clutter environments to check each ACM mode. Integration is particularly important for ACM modes. A qualitative assessment of the interaction of the radar, weapons controls, airplane instruments, visual scan etc. that will be used in an ACM environment is essential.

### 2.3.16.3. Instrumentation

Data cards, a stop watch and an optional voice recorder are required for this test.

### 2.3.16.4. Data Required

Record the ACM mode used, target and test airplane g, type of maneuver performed, and time from selection to lock-up of the ACM mode selected. Qualitatively describe the clutter environment to include whether the radar is looking into water, and its associated sea state, or into land, with a description of the terrain and cultural features. Record qualitative comments concerning the utility of the ACM modes for acquiring maneuvering targets.

### 2.3.16.5. Procedure

Place the target on the nose of the test airplane, flying in the same direction, straight and level and 1,000 feet above the test airplane until visual contact is established. Choose a speed for the target that allows the test airplane to maneuver moderately behind the target and still maintain separation. The range to the target should be 1/2 to 5 miles, consistent with the type of ACM mode being tested. Perform a series of rolling push-overs and pull-ups, keeping the target within the radar search volume. Attempt a radar acquisition in each of the ACM modes once while looking above the horizon in a non-clutter environment and once while looking down on the target into the clutter environment. Use a stop watch to time how long it takes from the time the ACM mode is selected until lock up occurs and target data is available. Qualitatively assess the location, display format, the type of target information, the accuracy of the information provided and the location and utility of the controls for selecting the ACM mode. Place the target in a level, constant airspeed, 3g turn and repeat the test. If visual contact is lost at any time during the test, both airplanes should level off and maintain steady flight until visual contact is regained.

### 2.3.16.6. Data Analysis and Presentation

Relate the overall utility of the ACM modes as an aid for acquiring the target in an ACM scenario and as a source of weapons targeting data. Pay particular attention to the time required to acquire the target and relate the time to the ACM environment. Relate the integration of the ACM modes with the rest of the weapons system in the context of the intense ACM environment. Confirm that the required information is available in a timely manner and in a format usable in a combat situation.

### 2.3.16.7. Data Cards

A sample data card is provided as card 20.

CARD NUMBER \_\_\_\_ TIME \_\_\_\_ PRIORITY L/M/H

# AIR COMBAT MANEUVERING MODES

[PLACE THE TARGET ON THE NOSE, ON THE SAME HEADING, FLYING STRAIGHT AND LEVEL, 1,000 FEET ABOVE THE TEST AIRPLANE AND AT \_\_\_\_ KIAS. PERFORM ROLLING PUSH-OVERS AND PULL-UPS, LOCKING THE TARGET UP IN EACH MODE, ONCE LOOKING DOWN AND ONCE LOOKING UP. NOTE THE TIME FROM SELECTION TO DATA DISPLAY.]

ACM MODE	RANGE	LOOK UP/DOWN (LU/LD)	TIME

[QUALITATIVELY ASSESS THE UTILITY OF THE ACM MODES TO ACQUIRE MANEUVERING TARGETS.]

LOCATION OF DISPLAYS AND CONTROLS:

DISPLAY FORMAT:

TYPE OF TARGET INFORMATION:

ACCURACY OF TARGET INFORMATION:

GENERAL CONTROL UTILITY: